September 30, 2014

MEMORANDUM

SUBJECT: Responses to National Remedy Review Board Recommendations for Operable Unit 4 (OU4) of the Cornell-Dubilier Electronics Site, South Plainfield, New Jersey

FROM: Walter E. Mugdan, Director
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U.S. EPA Region 2

TO: Amy Legare, Chair
National Remedy Review Board

The Environmental Protection Agency's (EPA's) National Remedy Review Board (NRRB) provided advisory recommendations to EPA Region 2 related to the proposed remedy for Operable Unit 4 (OU4) of the Cornell-Dubilier Electronics site, South Plainfield, New Jersey, in a memorandum dated September 26, 2014. The Region greatly appreciates the Board's thorough review and thoughtful comments on the proposed remedial action for the site, which was discussed during the Board's March 13, 2014 meeting and in subsequent conference calls.

The Region has incorporated many of the Board's recommendations into the Proposed Plan. Our specific responses to the Board's advisory recommendations are provided below. For convenience, each recommendation is presented in the order identified in your memorandum, followed by our response.

Human Health Risk

Recommendation (part 1): The package presented to the Board by Region 2 identified unacceptable risk from exposure to PCBs associated with ingestion of fish tissue from Bound Brook. The package described several sediment preliminary remediation goals (PRGs), including PRGs for a human health10^{-4} cancer risk, ranging from 0.21 to 0.38 milligrams per kilogram (mg/kg) from fish tissue consumption, and a PRG for human health (for a child angler eating bottom-feeding fish fillet) noncancer risk of 0.041 mg/kg, equivalent to a hazard index of 1 from fish tissue consumption. The Region's recommended sediment remediation goal is 1 mg/kg for total PCBs. The Region developed this value after consideration of several factors, including back-calculation from a fish tissue concentration associated with ingestion rates that would not yield unacceptable risks for some consumers. The Board recommends that more explanation be provided on deriving this final sediment remediation level. The Board also recommends that the Region consider monitoring fish tissue to provide data for evaluating how the cleanup is progressing towards attainment of the remedial action objectives (RAOs). The Board further recommends that the Region refer to Office of Solid Waste and Emergency Response (OSWER) Directive No. 9200.1-77D, July 2008, Sediment Assessment and Monitoring Sheet #1, *Using Fish Tissue Data to Monitor Remedy Effectiveness*.

Response (part 1): This will further explain the basis for the Region's selection of 1 mg/kg as the PCB sediment cleanup goal:

- It protects against risk associated with direct human contact with contaminated sediments. For

Bound Brook sediments, a site-specific, risk-based calculation of 10^{-6} incremental lifetime cancer risk associated with a human direct contact identified a remediation goal of 1 mg/kg. The most conservative calculated remediation goal for direct contact concentration associated with a non-cancer hazard (that achieves an HI of 1) in sediments was 13 mg/kg.

- While it is higher than the cleanup value that would address cancer risk associated with fish consumption, natural recovery over time should allow this result. Potential cleanup values calculated for a 10^{-4} incremental lifetime cancer risk for human fish tissue consumption ranged from 0.21 to 0.38 mg/kg. Assuming recent stream deposition patterns continue, after remediation of areas exceeding 1 mg/kg, the Region expects that natural recovery would reduce post-remediation sediment concentrations from 1 mg/kg to 0.25 mg/kg in two half-lives, or about 100 years.
- The ecological endpoints associated with PCB exposures generally support a PRG of 1 mg/kg and support an action that achieves a protective level in benthic invertebrates, semiaquatic birds and semiaquatic mammals through natural recovery. Specifically, 1 mg/kg is close to PRGs protective of some ecological receptors/endpoints, i.e., invertebrate critical body residues (0.61 mg/kg); insectivorous bird TRV (0.77 mg/kg); insectivorous mammal TRV (1.9 mg/kg).
- EPA developed a site-specific "resident-parklands" land use, which identifies conservative and representative land use for dermal exposure to the floodplains of OU4. This exposure scenario for a resident child would yield a10^{-6} incremental lifetime cancer risk-based PRG of 0.76 mg/kg, and a noncancer-based PRG of 2.6 mg/kg.
- New Jersey's promulgated nonresidential direct-contact cleanup criterion for PCBs is 1 mg/kg. While not an ARAR for the sediments, New Jersey has identified 1 mg/kg the appropriate standard for the floodplain soils.

The Region expects that a PRG protective of non-cancer hazard for child angler/bottom-feeding fish (0.041 mg/kg) cannot be attained through remediation given the urban site setting and ubiquity of PCBs (note the reference area concentration of 0.064 mg/kg PCBs in Lake Nelson), but that a remedy that includes active remediation and natural attenuation provides the best conditions for eventually achieving protective levels within the stream corridor. Protectiveness will be achieved through institutional controls, e.g. fish consumption advisory.

The Region agrees with the Board's suggestion that the Region consider monitoring fish tissue to provide data for evaluating how the cleanup is progressing towards attainment of the RAOs, and will incorporate this approach in the decision documenting long-term monitoring plans designed to evaluate/confirm the results of remedy implementation.

Recommendation (part 2): In the presentation to the Board, the Region indicated that separate exposure point concentrations (EPCs) for fish tissue data were developed for each exposure area. Since it is reasonable to assume that fish may migrate readily from one exposure area to another, the Board recommends that the Region provide a more detailed explanation in the decision documents as to why it grouped the fish tissue data in this way. For example, how does the presence of physical barriers that would restrict fish migration affect the fish grouping method? The Board also recommends that the Region consider developing an EPC using all available fish tissue data. This approach might then be used to compare each exposure area's EPCs against another to demonstrate that the risks would be consistent across areas, in the event that, at some point in the future, the fish are, in fact, able to migrate readily across various exposure areas.

Response (part 2): During the development of the risk assessment, it was unclear whether the existing physical barriers (*e.g.*, the New Market Pond dam, the Spring Lake weir and other historically noted impediments) actually prohibited fish migration from one location to another within the study area. Therefore, the Region developed separate EPCs coincident with the various potentially distinct brook zones to evaluate this issue. The approach for deriving EPCs for fish fillet tissue was based on statistical analyses to evaluate temporal and spatial patterns in total PCB concentrations as discussed in Section 4.2.1.3 of the OU4 Risk Assessment Report, and presented in Appendix E of the Risk Assessment. Separate EPCs were used to evaluate fish upstream of the former CDE facility (EU BB6), adjacent to the former CDE facility (EU BB5), between the former CDE facility and New Market Pond EUs BB4/BB3), in New Market Pond (EU BB2), downstream of New Market Pond (EU BB1/GB), and in Spring Lake (EU SL).

As a way to ensure that the Region's approach of using multiple EPCs did not mischaracterize the risks posed by fish consumption, the Region reviewed the cancer and noncancer risks derived from the multiple EPCs, and noted that there were human health risks outside the risk range in each EU (e.g., the entire study area). This would be the same outcome had the Region recalculated the risks using a single, site-wide EPC approach.

Ecological Risk

Recommendation: The materials presented to the Board by Region 2 summarize risks posed to wildlife by the contaminated sediments in OU4 (see Table 2 of the review package). It is unclear from these materials how the Region assessed risks from dioxin-like PCBs in addition to total PCBs. The Board recommends that the Region clarify in the decision documents the methods used to evaluate exposures and associated risks from dioxin-like PCBs. The Board also recommends that the Region refer to EPA 100/R-08/004, June 2008, *Framework for Application of the Toxicity Equivalence Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment.*

Response: Using the available PCB congener data, the Region evaluated PCB congeners with dioxin-like toxicity as TCDD TEQ (PCBs). Evaluations for the following abiotic and biotic media are presented in the indicated sections of the OU4 Risk Assessment Report:

- Benthic invertebrate tissue (Section 5.5.1.2) - The HQ_{NOAEL} and HQ_{LOAEL} for Asiatic clam tissue were all less than 1. PCB congener data were not available for crayfish. Although it has been shown that invertebrates are generally insensitive to PCB congeners that produce dioxin-like toxicity in other organisms (USEPA, 2008c) such that the toxicity equivalence methodology is not applicable to invertebrates, the fish TEFs (Van den Berg, 1998) were conservatively applied to calculate TCDD TEQ (PCBs) concentrations for comparison to CBRs. The low HQs for TCDD TEQ (PCBs) still reflect this lack of toxicity.
- Surface water and porewater (Section 5.5.2.1) - The HQs for porewater ranged from 65 (for fish) to 45827 (for birds).
- Fish whole body residue (Section 5.5.2.2) - For predatory fish, the HQ_{NOAEL} ranged from less than 1 to 3 at EU BB5, while the HQ_{LOAEL} were all less than one. For bottom-feeding fish, the HQ_{NOAEL} ranged from less than 1 to 9 at EU BB5, while the HQ_{LOAEL} were all less than one.

- Fish egg residue (Section 5.5.2.3) - The HQ_{NOAEL} for predatory fish eggs was less than 1 for all EUs. The HQ_{NOAEL} for bottom-feeding fish eggs ranged from less than 1 to 2 at EU BB5, while the HQ_{LOAEL} for all EUs are less than 1.
- Food web modeling (Section 5.5.3.1- For bird receptors, the HQ_{NOAEL} ranged from less than 1 to 23 and the HQ_{LOAEL} ranged from less than 1 to 2, with the highest HQs for belted kingfisher at EU BB5. For mammal receptors, the HQ_{NOAEL} ranged from less than 1 to 71 and the HQ_{LOAEL} ranged from less than 1 to 7, with the highest HQs for American mink at EU BB5.
- Bird egg residues (Section 5.5.3.2) - Based on predatory fish tissue concentrations, the HQ_{NOAEL} ranged from 247 at EU BB6 to 4,672 at EU BB5, while the HQ_{LOAEL} ranged from 25 at EU BB6 to 467 at EU BB5. Based on bottom-feeding tissue concentrations, HQ_{NOAEL} range from 190 at EU BB6 to 11,925 at EU BB5, while the HQ_{LOAEL} ranged from 19 at EU BB6 to 1,193 at EU BB5.

Note that ecological-risk based PRGs were derived for total PCBs under the assumption that remediation of total PCBs will reduce the concentration of the PCB congeners with dioxin-like toxicity to a protective level as well.

Remedial Action Objectives/Preliminary Remediation Goals

Recommendation: The package presented to the Board included a sediment PRG for fish consumption as low as 0.041 mg/kg (noncancer, child angler consuming bottom-feeding fish fillet), and a direct-contact PRG equivalent to 10^{-6} cancer risk of 1 mg/kg. The sediment concentration cleanup goal predicted to be achieved after several decades of monitored natural recovery is 0.25 ppm. As presented to the Board, the Region's basis for remedial action objectives (RAOs) states that "PRGs for a 10^{-4} cancer risk for human fish tissue consumption ranged from 0.21 to 0.38 mg/kg." During the presentation, the Region clarified that fish tissue levels would be used to measure remedy performance but not as cleanup level. The Board recommends that the decision documents include the risk-based fish tissue target concentration and more clearly describe the role of fish tissue levels as a performance measure for achieving RAOs. The Board also recommends that the Region clarify in the decision documents the sediment cleanup level (1 mg/kg or 0.25 ppm) and when it is expected to be achieved.

Response: Please see Region's response to the Board's Human Health Risk Recommendation Part 1 for discussion of the Region's sediment PRG of 1 mg/kg. The Region does not plan on identifying fish tissue target concentrations as an RAO, however, the Region does intend to monitor sediment, floodplain soil and fish tissue concentrations to measure remedy performance and whether the RAOs have been achieved. A brief description will be provided in the decision document, with the details of the monitoring to be provided in remedial design documents following remedy selection.

Remedy Performance

Recommendation (part 1): Based on the information provided to the Board, the Region is considering the use of an innovative technology (e.g., a reactive cap composed of zerovalent iron (ZVI) and activated carbon) as a feasible and cost-effective approach for treating groundwater discharges to the Bound Brook in the 1600-ft reach. The Board notes that a stakeholder comment from the Edison

Wetlands Association suggested that the Region should consider ZVI technology, and/or pump and treat technology, to address the discharge of contaminated groundwater to Bound Brook. The Board also notes that the main degradation mechanism of VOCs [i.e., TCE to cis-dichloroethylene (DCE)] with ZVI is through chemical reductive dechlorination. The Board further notes that this degradation mechanism works more efficiently under already-reducing conditions so that ZVI will not be consumed by dissolved oxygen in water, whereas both PCBs and VOCs can be removed via adsorption by activated carbon. The Board recommends that the Region consider other cap designs, such as a two-layer cap (ZVI in the bottom layer and activated carbon layer at the top for a single mat) or two separate caps with the ZVI mat in direct contact with the groundwater seep at the groundwater/surface water interface and an activated carbon mat on top in contact with Bound Brook. If the Region decides to pursue other cap approaches, the Board recommends conducting appropriate pilot tests to evaluate alternative designs, with consideration of specific water geochemistry and breakthrough behavior.

Response (part 1): Subsequent to the Board's meeting, taking into account the Board's comments and Regional deliberations, the Region has concluded that the preferred alternative for groundwater should be hydraulic control, as opposed to a reactive cap. However, if the selected remedy ultimately includes capping, as discussed in this recommendation by the Board, the Region will consider various cap designs and will evaluate whether pilot tests are warranted.

Recommendation (part 2): Based on the information provided to the Board, it appears that TCE dechlorination through natural processes is taking place at or near the interface between groundwater and surface water, as demonstrated by the conversion of TCE to cis-1,2-DCE when measured in surface water. The Board recommends that the Region further evaluate this phenomenon. By treating groundwater in this area to complete VOC degradation and because PCBs have very low water solubility and require high concentrations of VOCs to become mobile in groundwater, the Region may also eliminate the transport mechanism of PCBs from groundwater to surface water..

Response (part 2): As noted above, as a result of further deliberations, the Region now expects to propose hydraulic control as the preferred alternative to address the release of contaminants from groundwater to surface water within the Bound Brook study area.

Recommendation (part 3): The Region's presentation to the Board indicated that fish tissue PCB concentrations were elevated in Spring Lake; however, the Region has indicated that no direct remediation is planned within Spring Lake because sediment and surface water concentrations in Spring Lake and its feeder stream, Cedar Brook, were not elevated for any of the site's COCs. The Board notes that, since there is PCB fate and transport mechanism uncertainty, this approach may result in PCB-contaminated fish in Spring Lake. The Board recommends that the Region develop a plan for this OU to address this fish contamination and the risk to human health from fish consumption in Spring Lake.

Response (part 3): While there is some uncertainty regarding the mechanism by which the fish collected within Spring Lake acquired/consumed PCBs, the Region has concluded that the fish did not uptake PCBs in Spring Lake. The surface water and sediment in Spring Lake were not found to contain site-related COPCs and Spring Lake is not considered a source. However, the New Jersey Department of Environmental Protection (NJDEP) has issued a fish advisory that covers Spring Lake and the adjacent waters, which warns anglers of a catch and release requirement, and a complete ban on fish consumption. The Region considers NJDEP's fish

consumption advisory to be a valid and appropriate method to address consumption of potentially-contaminated fish in Spring Lake.

Recommendation (part 4): Based on the presentation to the Board, significant flooding events occur within Bound Brook throughout a majority of the year. These flooding events could potentially cause significant issues during excavation activities along the banks of the brook. In order to reduce the degree and frequency of flooding, the Board recommends that the Region consider installing shallow "benches" along the banks as part of the bank removal and discuss this and other options with the GE-Housatonic River team in Region I.

Response (part 4): Comment is noted and will be considered during remedial design to the extent relevant.

Alternative Remedy

Recommendation (part 1): The Board was presented with the Region's remedial options to address groundwater discharging to Bound Brook. The preferred remedial option of a reactive cap (GW-5) would treat groundwater so as not to adversely impact Bound Brook. Some of the contaminated groundwater adjacent to Bound Brook is already being addressed as part of the previous OU3 remedy that includes a technical impracticability (TI) waiver. While a TI waiver zone was established for OU3, the Board recommends that a new, updated TI waiver report be developed for that portion of the groundwater addressed by this remedial action but not addressed by the OU3 TI waiver. The Board recommends that the Region address any OU4 TI waiver for contaminated groundwater in a manner that is consistent with CERCLA 121(d)(4)(C), the NCP (e.g., 40 CFR 300.430(f)(1)(ii)(C)(3)), and existing CERCLA guidance (*e.g.,* OSWER Directive No. 9200.1-23P, July1999, *A Guide to Preparing Superfund Proposed Plans, Records of Decision and Other Remedy Selection Decision Documents,* section 9; OSWER Directive No. 9234.2-25, October 1993, *Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration*). The Board also recommends the Region add a groundwater RAO to the decision documents for this remedial action, and recommends that this RAO be consistent with the RAO found in the OU3 record of decision.

Response (part 1): As discussed in the OU3 ROD, the Region invoked a waiver for groundwater ARARs, but deferred action on the area of the groundwater that has the potential to discharge to Bound Brook. The OU3 ROD indicated that EPA would evaluate additional information collected as part OU4 prior to making a TI determination for the deferred area of groundwater (the "OU4 groundwater"). This additional information is incorporated in the OU4 RI/FS, and is the basis for the source control alternatives considered for the groundwater.

As discussed in the OU4 Feasibility Study Report, the OU4 groundwater is completely surrounded by the OU3 ARAR waiver zone, and there is no technical distinction, relevant to technical impracticability, that differentiates the OU3 and OU4 groundwater. In consultation with OSRTI, the Region is developing a TI evaluation that will be included in the OU4 Feasibility Study Report to support the Region's expectation that the ARAR waiver will need to be expanded to include the OU4 groundwater.

The decision documents will include an RAO for groundwater that aligns with the OU3 ROD. The OU3 ROD defines the further groundwater actions to be evaluated in the OU4 RI/FS narrowly:

> "The OU4 investigations, including the human health and ecological risk assessments, will evaluate whether contaminated groundwater that may be discharging into Bound Brook poses an unacceptable risk to human health and the environment. Depending upon the results of the OU4 RI/FS, additional groundwater actions may be contemplated as part of an OU4 remedy. EPA is deferring action on the area of the groundwater that has the potential to discharge to Bound Brook. OU4 will evaluate all potential contaminants of concern, but this deferral is based upon uncertainties about the fate and transport of PCBs, which have already been identified as a potential contaminant of concern for the Brook, and not VOCs."

The OU4 risk assessment did also identify a small area of unacceptable risk attributable to discharging VOCs, but the primary area of concern identified in the OU4 RI/FS is the ongoing release of PCBs groundwater to surface water. While the Region deferred establishing a TI waiver for the area of groundwater-to-surface water transport as a matter of policy (because further actions were contemplated for this area), the OU3 RI/FS addresses the technical impracticability of groundwater restoration in its entirety, for OU3 and OU4. The OU4 RI/FS includes an appendix that will serve at the basis for expanding the TI waiver area to include the OU4 area.

Recommendation (part 2): The Region indicated that its preferred alternative for the sediment/floodplain soil remedy component includes excavation and off-site disposal of 260,000 cubic yards of floodplain soils at a substantial cost. The quantity and cost estimates assume soils over a 32-acre floodplain area would be excavated until the 1 mg/kg remediation level for PCBs is reached, which is estimated to be down to an average depth of 5 feet (surface and subsurface soil). The Board recommends that the Region re-evaluate the necessity to remove subsurface soil in order to achieve the RAOs, which are all based on surface soil exposure pathways. The Board also recommends that the Region refer to OSWER Directive No. 9355.4-24, December 2002, *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*. The Board notes that if the Region is concerned about subsurface soils "day-lighting" over time, a geotextile matting could be put in place prior to backfilling.

Response (part 2): In response to the Board's comment, the Region reviewed the RI/FS with regard to the depth-of-contamination assumptions for the floodplain soils and concluded that the assumption of a 5-foot depth of contamination within the floodplain was too conservative. The FS cost assumptions and text now include an assumption of an average depth of floodplain contamination of 3 feet.

The consequences of this change are two-fold: the costs for Alternative SS2 and SS3 are lowered, and the Region's rationale for preferring excavation (SS2) over a combination of excavation and capping (SS3) for the floodplain become better defined. The Region considers that the Feasibility Study, and the preferred alternative, appropriately incorporated conservative assumptions with regard to extent of contamination were warranted, but agrees that during

remedial design, the volume of contaminated soil may be found to be less than the estimate (using a 3-foot average excavation depth) of 150,000 cubic yards.

The Region will determine the final depth for excavation based on the extent of PCB contamination. In Alternative SS3, the Region did evaluate the potential for capping in areas of the floodplain where capping could be implemented without disrupting normal surface water flow patterns. However, the preferred alternative does not include capping, for a number of reasons:

- The majority of the floodplain soils are located in areas that are prone to flooding resulting in the need for cap armoring.
- The loss of flood storage caused by the addition of capping material could have substantial adverse effects in a setting that is already plagued with flooding problems; this is an implementability issue and a community acceptance issue.
- Capping may prevent the remedial action from meeting an expectation of "no net fill" in a wetland or restoring the existing habitats when the action is complete.
- The area is currently in use as a nature walk and adjacent to parks and residential communities, such that there is frequent public access to the area.
- Because the largest area of floodplain that needs to be addressed by this action is bounded by two brooks (Bound Brook and Cedar Brook), only a limited area is feasible for capping without disrupting surface water drainage patterns.
- This type of setting is prone to burrowing animals and vegetation that would disrupt the effectiveness of any potential cap, so that regular maintenance would be required in perpetuity to ensure protectiveness.

Based on the OU4 remedial investigation findings, the Region anticipates the depth of excavation to be approximately 2 to 3 feet in upland areas and up to 4 to 5 feet along the banks of the brook, with an average depth of 3 feet; the Region will conduct additional sampling as part of the remedial design. In the upland areas where capping would be potentially feasible, the majority of the contamination would be removed simply by the stripping of topsoil and vegetation that would be needed for cap construction. Had the data suggested that PCBs were substantially deeper, with a thicker layer of clean cover before the contaminants were reached, then the Region might have considered addressing deeper PCB-contaminated soil differently, but this is not the case at this site. This will be clarified in the decision document.

Applicable or Relevant and Appropriate Requirements

Recommendation: In the package provided to the Board by Region 2, Table 6-1 lists potential applicable or relevant and appropriate requirements (ARARs). The Board notes that Clean Water Act section 404 and its associated regulations are not specifically mentioned. Clean Air Act National Ambient Air Quality Standards are listed as an ARAR but are not promulgated standards. The Board recommends that the ARARs section of the decision documents be reviewed by the site attorney. In addition, the Board recommends that the ARARs citations be more specific and that the Region refer to EPA/540/G-89/006, August 1988, *CERCLA Compliance with Other Laws Manual: Interim Final* for examples.

Response: Section 404 of the Clean Water Act will be identified as an ARAR in the decision documents for this action; the Clean Air Act National Ambient Air Quality Standards will be not

be cited as ARARs. The Region's Office of Regional Counsel attorney is an integral component of the site team.

Principal Threat Waste

Recommendation: In the package provided to the Board by Region 2, the capacitor debris RAO is described in part as "remove, treat, or contain principal threat waste to the extent practical." In addition, the Region's preferred alternative for capacitor debris is excavation and off-site disposal. The information presented to the Board also indicated that sediment PCB concentrations may exceed 100 mg/kg. The Board recommends that the decision documents explain how the RAO and cleanup approach for the capacitor debris and sediment is consistent with CERCLA, the NCP and existing CERCLA guidance, including, specifically, CERCLA § 121(b)(1)'s preference for treatment "to the maximum extent practicable;" CERCLA § 121(d)(1)'s requirements regarding selection of remedies that ensure protectiveness of human health and the environment and achieve (or where appropriate, waive) ARARs; 40 CFR § 300.430(a)(1)(iii)(A)'s expectation that "treatment [be used] to address the principal threats posed by a site, wherever practicable;" and 40 CFR § 300.430(f)(1)(ii)(E)'s preference for treatment "to the maximum extent practicable" while protecting human health and the environment, attaining ARARs identified in the ROD, and providing "the best balance of trade-offs" among the NCP's five balancing criteria; and OSWER Directive No. 9380.3-06FS, November 1991, *A Guide to Principal Threat and Low Level Threat Wastes.*

Response: A reference to the EPA's *A Guidance to Principal Threat and Low Level Threat Wastes* will be added to the "Remediation Goal" section of the Proposed Plan and other decision documents as necessary. The decision documents will also reference EPA's 1990 guidance "Guidance on Remedial Actions for Superfund Sites with PCB Contamination", which provides specific recommendations for identifying PCB concentrations as principal threats.

The Region evaluated on-site treatment of capacitor debris using low-temperature thermal desorption (LTTD), which would remove or destroy PCB contaminants from on-site soil and debris, thereby reducing the toxicity, mobility or volume of PCBs. On-site LTTD was used effectively as part of the CDE site OU2 remedy to treat PCBs; however, LTTD had limited effectiveness in treating still-intact capacitors and, during the OU2 remedy, many capacitors had to be removed from the soil before treatment and sent off-site for land disposal.

In addition, siting a LTTD unit would be difficult. During the OU2 remedy, EPA successfully operated the LTTD unit at the former CDE facility property. Depending upon the status of the redevelopment of this facility, some limited space may be available for use. However, the likely siting location for a LTTD unit would be at the southeast portion of the facility, a location slightly lower in elevation and more prone to flooding in a severe flood event. If the LTTD unit could not be sited at the former CDE facility, siting such a facility elsewhere may be more challenging. Therefore the Region's preferred alternative does not include on-site treatment and the Region strongly believes that on-site treatment is not appropriate for OU4.

Excavation and off-site disposal of principal threat waste, while reducing its impact on OU4, would not change the mass, volume or toxicity of the contaminants, and while treatment of some wastes sent off-site may be required prior to land disposal, the requirement for treatment would be governed by the requirements of the receiving facility and would not be a "principal element"

of the selected remedy; therefore, it would not satisfy this criterion. Given the nature of the wastes, which contain large quantities of debris and, in the principal threat areas, capacitors and capacitor parts, few off-site thermal treatment facilities would be equipped to receive these wastes for treatment. The Region has concluded that further efforts at off-site treatment, independent of those required prior to land disposal, would not be practicable.

Cost

Recommendation: In the package presented to the Board, the Region's preferred alternative for the existing 1,700-linear foot, 36" waterline (which runs directly through the former CDE facility) is abandonment and relocation/construction of a new waterline within the public right-of-way. The total present worth cost estimate for this new, approximately 1,700-linear foot waterline is $8.3 million. In addition, it appears from the information presented to the Board, that the capacitor debris excavation work proposed in Alternative CD-4 along Bound Brook and the former CDE facility will be in very close proximity to the existing waterline. The Board recommends that the Region look at the potential to integrate the proposed CD-4 open excavation work with relocation of the waterline within this same excavation area along the south/southeast side of the former facility back onto Spicer Avenue with an eventual tying into of New Market Avenue. Finally, the Board recommends that the Region review the detailed cost estimate for Alternative WL-2, since the presentation noted the total cost as $3.9 million, whereas the backup detailed cost estimate (Table 10-1) identifies the total cost as $7 million.

Response: The Region has reviewed the costs noted by the Board and has revised them as necessary to ensure that all costs are accurate. The information will be included in the Proposed Plan and will be consistent with the Feasibility Study. Regarding the Board's suggestion that the Region integrate remedies, the Region will work towards scheduling the remedies and their completion concurrently, if it is determined to be advantageous, as the Board notes. Assuming that a decision is made to relocate the waterline to a location near the capacitor debris area, the Region will make all reasonable efforts to accommodate the Board's recommendation.

Comparative Analysis

Recommendation: The Region indicated in the package that the groundwater preferred alternative (GW-5) would be technically challenging to implement. The Board recommends that the Region reassess the costs, implementability, and long-term effectiveness and permanence of the proposed reactive cap groundwater remedy as compared to the conventional pump and treat groundwater remedy (alternative GW-3). The Board notes that the conventional approach may offer some advantages (e.g., ease of implementation and simpler maintenance) with much less risk.

Response: See the Region's response to the Board' Remedy Performance recommendation above. Subsequent to the Board's meeting, taking into account the Board's comments about uncertainties related to the long-term performance of a reactive cap that have the potential to offset the lower operation and maintenance costs projected for this technology, the Region has concluded that the preferred alternative for groundwater should be hydraulic control, as opposed to a reactive cap.